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MODIFIED CAUSATION FOR PSYCHOLOGY.

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In a paper of originality not long ago¹ Dr. Woodbridge spoke of the pleasure which many derive from the question of interaction and parallelism. He told us, with no attempt at consolation, that the view of consciousness which he presents sweeps away the problem of mind and body and all the pleasant dissipation which this involves. After such a gay disposal of the case, it would seem almost wanting in respect to continue to discuss the old matters as though nothing whatever had occurred. My own reasons for believing in the continued existence of this problem have, however, already been set forth,² and I wish now to speak of a way of modifying our thought of causality, which will perhaps help us to avoid some of the difficulties which beset this field.

The chief motive which induces so many psychologists to vote against interaction, which has mountain-high evidence in its favor, and to support parallelism, although this is so alien to the spirit of modern science—the chief motive, it seems to me, is that we are almost possessed by a fixed idea as to the requirements of the causal relation.

We are inclined to say, in the first place, that a mental event and a physical event can never be regarded as cause and effect, respectively, since the two occurrences cannot be conceived as parts of one continuous process. We cannot observe (it is said) nor can we well imagine the suitable connecting links between facts so diverse. Nor can the farther requirement be met that cause and effect should display a certain quantitative equivalence. Physical and mental proc-

¹ 'The Nature of Consciousness,' *Journ. of Philos.*, II., 119.

² 'The Difference between the Mental and the Physical,' *PSYCHOL. BULLETIN*, III., 1; 'The Character of Consciousness,' *PSYCHOL. BULLETIN*, III., 117.

esses are so unlike, that no common unit of measurement in the two realms is possible.

When passing judgment in a matter of this character we must bear in mind that the idea of causation as we find it in use in natural science is a curious mixture of elements from different sources — from 'experience,' and from sources other than experience. In the language of philosophy, many of us would willingly say that our notion of causality is *a priori* — that it is not derived from experience; but, on the contrary, the organization of our sense-impressions into an orderly experience would be impossible were it not for the activity of this causal energy within us.

And yet this is by no means the whole truth. For in its modern development the causal idea requires the facts to conform to certain tests before they may be regarded as joined in the causal bond. And these tests themselves are not arrived at *a priori* and independently of all sense-experience. Thus we cannot say that the features which many now regard as essential to the causal relation — namely, the equivalence between what the cause loses and what the effect gains, and the possibility of a continuous transition from one of these terms to the other — we cannot say that all of this lies as deep in us and has the same original certainty as does the thought that every occurrence has some cause. We have an ungovernable instinct to search for causes; but for recognizing a cause when we see it, nature leaves us to our own devices. We must learn the special marks of causes and effects; only by observation can we determine what tests the facts are capable of meeting. The growth of science has brought new formulations of what is implied in the causal relation. But men believed practically that things have causes, and selected with perfect assurance those events which would explain other events, long before they became convinced that a continuous transition or a quantitative equivalence is in any way involved in the causal link.

There is thus an empirical element in these tests, which does not appear in what we may call the original idea of cause. If men had not observed that outward facts did in many cases actually reveal transitions and equivalences, it would never have occurred to them to demand that such transitions and equivalences should be present in every case. The scientist would still have believed in the cause-and-effect relation, just as the farmer and the merchant today believe, without being mathematically scrupulous in selecting the special events between which the causal relation should be thought to exist. Two events, — let us say a great demand for some commodity and a high

price for it,—regularly occur together, the one increasing as the other increases, and diminishing and disappearing as the other diminishes and disappears. A bare concomitant variation of this kind, where it is impossible to observe any exact mathematical ratio between the changes in the two events, would have amply satisfied our requirements for a causal connection, if the outer world had steadfastly refused to give us more. But we so often find cases of concomitant variation where the changes in the two events *can* be reduced to some common unit of measurement and expressed in an equation, or where we can pass without break from one to the other occurrence, that we have become spoiled and ask for this in all cases. But these special requirements are not an inevitable logical development of the idea of cause,—a development like that of the idea of 'triangle' into the *pons asinorum* and all the other theorems and corollaries regarding three-sidedness. The various features in the idea of causation which physics has adopted cannot all be demonstrated by abstract logic and without appeal to the contents of actual experience. They are not prime necessities of our thinking. The rather they are, in a large measure, habits of thought which the course of empirical events has started and encouraged. The division between what is original and what is an after-accreration is hard to make, but it is similar to what we have in the case of all our other primitive instincts. Marriage, for instance, has in and behind it a fundamental and *a priori* element: the young man's fancy lightly and inevitably turns to thoughts of love. This much Nature dictates. But Nature does not, in the very instinct, determine the kind of wife he shall select. There is no fatal decree that the approved one shall be just eighteen or play the violin or bring exactly so much in dowry. So far as the mating instinct is concerned, the young man here is free.

When once we notice that in the scientific search for the causes of events in our experience our action has a like composite *Motivirung*,—that our guiding idea is a mingling of an original element and of elements due to circumstances and special outward encouragements—the bearing of this on the problem of causation in psychology is clear. The form which the principle of causation has assumed in our modern sciences is largely the result of observations in the field of physical research. It is not some sacred and inviolable idea whose slightest change would profane and destroy its very essence. It was originally given us in the rough, and we have shaped it to our needs. But the particular form which answers the needs of physical research is not necessarily the one best suited to its use in that larger world which in-

includes things mental as well as physical. In the long run we can hardly afford to have the form of an idea which is used so universally determined solely by the needs and successes of physical science. We must give it that shape and fashion which will bring the greatest intellectual happiness to the greatest number. If the idea of cause as defined for physical research could be effectively applied in psychology and in the intermediate realm of psycho-physiology, it would indeed be well; but there is little hope that this will ever be. The physical conception of cause will not work in psychology, it will not work in the borderland of brain and mind. The question as to the nature of causation, therefore, is for science in the large a vital one. Upon its issue hangs the success or failure of our attempted conquest of the larger world. We have before us this alternative: either we must modify our idea of causation, or we must cease to speak of causation as a universal principle in our experience. It seems to me that if this really is the case the outcome is not difficult to foresee. We shall not give up the universality of the principle, but we shall surrender some of the special tests which physical events in their intercourse with one another can meet, but which events generally cannot. But this does not mean that all tests shall be abandoned. We have merely to limit our demands. For instance, we might still require concomitant appearance, variation, and disappearance, but not perfect continuity nor quantitative equivalence; and the various 'canons of induction' might still be employed to determine whether a causal relation exists or not. Causation thus restored to more simple lines could not only be used in psycho-physiology and we should no longer feel forced to the artificial parallelist assumption, but such a conception of causality might be used for the interconnection of psychic events directly with one another, and not just indirectly by first connecting them with neural processes.

To all who are interested in the stability of thought and of the scientific method such a proposal will seem less revolutionary when a precedent for the change is pointed out. On the philosophic side of science a precedent is right at hand. We are accustomed to shift our meaning of the word 'cause' as we pass from one field of work to another. Thus he who seeks for causes in a transcendental realm makes not the same demands of his cause as the natural scientist makes of his. The philosopher proves the sufficiency of his proposed cause by other tests than are used in the world of sense. For metaphysics, the cause and its effect need not be simultaneous, they need not vary the one with the other, they need not be the same in quantity. Between this metaphysical extreme and the physical extreme may there

not be some intermediate and yet valid idea of cause? Psycho-physiology and psychology form a kind of bridge between the sciences of things visible and the sciences of the invisible world; for the objects of psychology are not before the bodily eye, as are the objects of the physical world, neither are they grasped mainly by reason and desire, as are the things of the ideal world. The occurrences of the mind are experienced directly, like physical events, and yet for the most part they are invisible like the things of the spirit. They partake of both natures, and may well require for their study modified instruments and modified ideas.

PSYCHOLOGICAL LITERATURE.

EMOTION AND FEELING.

Essai sur les passions. TH. RIBOT. Paris, Alcan, 1907. Pp. vii + 192.

The term *πάθη* among the Greeks denoted a wide range of affective phenomena, including appetite and desire. Aristotle describes them, in general, as states powerfully influencing judgment accompanied by pleasure and pain. There was some dispute as to their subject, whether it was the body or the soul, and whether, if the latter, reason was affected or only the irrational faculties. The prevailing view was that they were affections of the soul, but only in its inferior parts organically united with the body; Chrysippus, however, regarded them as diseases of the reason itself. Besides the noteworthy attempt on the part of the Stoics to classify them in terms of movement (contraction-expansion, inclination towards — recoil from), there was also some recognition of the difference between *πάθος* as a transient disturbance and as a more or less permanent and ingrained character (e. g., in Aristotle's distinction between *πάθη* and *ξέπεις*, and in the Stoic distinctions of emotional dispositions, chronic ailments and infirmities), but this recognition was imperfect and ill-grounded and led to no fixed terminology.

The *πάθη* of the Greeks became the *passiones*, *affectus* and *affectiones* of later writers, the term generally preferred being perhaps *affectus*. In modern times, down to the last century, French and English writers quite generally treated the same phenomena under the term 'passions.' Now, however, this term, in this sense, has almost entirely disappeared from our psychological text-books, its place having been taken, under the influence apparently, as Ribot suggests, of Darwin and Bain, by 'emotion,' the indiscriminate use of which perpetuates not a little of the confusion which, in this department of psychology, is our inheritance from the Greeks.

In a paper on the specific marks of passion read at the International Congress of Psychologists at Rome in 1905, Ribot sought to clear up this confusion by restoring to psychology the term 'passion,' but in a restricted sense, and at the same time limiting the meaning of 'emotion.' The meanings proposed were in general accord with Kant's well-known distinction between *Affekt* and *Leidenschaft*. Instead, however, of stopping with Kant's metaphors, Ribot undertook a thorough analysis.

Provisionally grouping the phenomena of the affective life into affective states, emotions and passions, and including under the first head appetites, tendencies and desires, he distinguished emotions as violent but transient disturbances of the psychic equilibrium, from passions as states originating in phenomena of the first group and characterized, not merely by relative permanence and strength, but especially by the predominance of fixed and controlling ideas. In this description passion appears as not only differing from emotion, but even as its contrary. Emotion appears as a primary state, the direct result of the natural constitution, passion as a secondary formation, partly natural, in that its basis is found in instinctive tendencies, in certain cases in 'temperament,' partly artificial, in that it is a product of thought and reflection. The paper was devoted to the elaboration of this description. Emphasis was put on the instinctive tendencies as the basis of the passion and on the fixed or dominant idea in its organization. Every passion — such was the thesis — is an attractive or repulsive tendency becoming concrete and self-conscious in an idea. It is acknowledged, of course, that just as a chronic disease is liable to acute attacks, so a long continued passion is traversed by emotional accesses.

The present work contains a further elaboration of the subject under three heads, — the nature of passion, the 'genealogy' of the passions and how passions end. The first and third parts have already appeared separately in the *Revue philosophique*. The gist of the first part is contained in the following : "Viewed synthetically, passion is a solid bundle of coöperant forces : at the center a tendency vigorously impelled towards an end; dragging into its vortex perceptions, images and ideas; adding to the real the work of the imagination; sustained, finally, by a logic both rational and extra-rational" (p. 42). The third part shows passion terminating in five different ways, — by being sated, by transformation into another, by the substitution of another, by insanity and by death, the general conclusion being that "the probability of a passion becoming extinct is directly proportional to the amount of emotional and inversely proportional to the amount of intellectual elements systematized in it" (p. 143). This again vindicates the conception of passion as an intellectualized form of tendency. The general position is still further elucidated by the two middle chapters of the book, now published for the first time, treating of the 'genealogy' of the passions. Ribot laments at the beginning of this part of the discussion the almost complete absence of any positive knowledge of the physiology of the passions in detail. His own treatment is based on a practical classification of tendencies into those of self-preservation,

of race-preservation, of self-expansion — the affirmation of the will-of-power — and a fourth group representing more individual and varying needs. He then seeks to show under what conditions what passions arise from these several tendencies. Thus from the first two develop the passions of gluttony, drink and sex; from the third, according as it works by sympathy or aims at conquest or destruction, such passions as the extreme form of maternal affection, the many passions of adventure, the passion of avarice, hate seeking vengeance, jealousy; while from the fourth we get the various, usually complex and often highly artificial æsthetic, scientific, religious, political and moral passions.

The discussion of the passions in this last group is particularly full and in the main original. As an illustration of the method we may take what is said of the passion of art. The basis of this passion, it is said, is the æsthetic sentiment, now generally regarded as having its source in surplus energy. The need of this particular form of 'play' activity has various degrees of intensity. In most men it is a subordinate incident of life. In the great creative artists it becomes, we may say, a sort of passion, since their activity is undoubtedly controlled by a dominant and tenacious idea. Yet theirs is not the passion in its extreme form, not what we especially mean by the passion of art. This extreme form, blind, absolute and intolerant, belongs, as a rule, not to the creative artists, many of whom have lived a rich and varied life, many-sided in interest, but to the dilettante, and is hardly to be met with before the nineteenth century. Ribot finds the explanation of this passion in the decay of religious faith and the substitution of art as the consoling ideal, in the tendency of these 'æsthetes' to withdraw from the world of action and to live in a world of the imagination, finally, in the influence, according to the character, of pride and vanity.

This is the third work which Ribot has published in recent years on the psychology of the affective life. The *Psychology of Feeling*, the *Logic of Feeling* and this essay constitute the most notable exposition of a connected doctrine of the 'affections' made by any author in our time. Together they afford a conspectus of the present state of psychology in this field and contain besides solid contributions to its advance. Nor has Ribot probably ever done anything better than the present short, but masterly essay. The more his central positions are reflected on, the more likely are they to be accepted. Objections to his view of passion on the score that, *e. g.*, dogs and children exhibit jealousy, and yet can hardly be said to have this feeling intellectualized, are trivial; it is only necessary to consider that the same names

may be applied to very different phenomena. Ribot has pushed his analysis further. He has shown that there are indeed many important forms of the affective life characterized and formed as he describes. We cannot do better than, in respect to passion, at least, to adopt his terminology. There is nothing, it should be added, in his treatment that is doctrinaire; he is as fully aware as any one of the subtle transitions between the various forms of affection and of the great differences in their duration and degree.

SMITH COLLEGE.

H. N. GARDINER.

Ueber Gefühlsempfindungen. C. STUMPF. Zeitsch. f. Psychol., 1906, XLIV., 1-49.

This article, the substance of which was given last year as an address before the second Congress of the Society for Experimental Psychology, is an able plea for regarding what are sometimes termed sense-feelings, including what are commonly termed feeling-tones, as sensations. The enquiry embraces bodily pains and pleasures as well as the pleasantness and unpleasantness connected with the special senses. The question, in short, is the old question of pleasure-pain as it used to be discussed before it came to be so generally recognized as now that bodily pain, at least, *Schmerz* (and presumably also bodily pleasure, *Wollust* and its congeners) is a specific sensation-quality and that the real matter now in dispute is as to the nature and psychological relations of the pleasantness and unpleasantness of various kinds of 'contents.' It will seem to many, therefore, an antiquated enquiry whether everything here included is to be regarded as (a) an attribute of sensation ('affective tone'), or (b) a unique kind of psychic element ('feeling' or 'affection' *vs.* sensation), or (c) sensation. The enquiry, it may be urged, should have excluded bodily pain and (some would urge) bodily pleasure, and should have limited itself to the affective algedonic qualities. The objection, however, is overruled if we accept Stumpf's doctrine of the disagreeableness of pain. It is commonly assumed by those who regard bodily pain as a sensation, that it is a sensation having, usually, an extremely disagreeable affective character, and that thus there is a distinction between the disagreeableness of the pain and the sensation-quality of the pain as pain. This distinction Stumpf denies; he holds that painfulness is the essential quality of the sensation of pain in the same way that warmth is the essential quality of its sensation, and explains the so-called pleasure of pain as due to other added conditions. If this is conceded, then evidently there is one sensation at least,—and the same argument would naturally apply to bodily pleasure — which is at the

same time an affective quality. It is possible, therefore, to entertain the suspicion that affective qualities generally may be essentially sensations. The case of pain would not justify the conclusion that pleasantness and unpleasantness are everywhere but differently modified intensities of bodily pleasures and pains. The question of kinds is left open. But it justifies the inclusion of bodily pains and pleasures in the question of a general theory.

Stumpf reproduces Külpe's most convincing arguments against the 'attribute' theory of pleasure-pain. The choice, therefore, lies between regarding these feelings as unique mental elements and regarding them as sensations, and the latter view has in its favor the principle of economy unless there are conclusive reasons to the contrary. Stumpf has no difficulty in showing that the positive marks usually held to distinguish the sense-feelings from sensations, *e. g.*, subjectivity, absence of localization, etc., are insufficient. The negative argument on which Külpe chiefly relies, namely, that pleasure-pain cannot be ideally revived, is held not to hold for bodily pleasures and pains, while the fact that the ideal revival of smells, colors, tones, etc., is commonly connected with real feelings of pleasantness or unpleasantness is not regarded as conclusive against the sensation theory. For it may be plausibly suggested that here the original feeling-sensations are centrally excited and that any revival of the process tends, therefore, to be hallucinatory.

The greatest difficulty is in applying the theory to the so-called feeling-tones of sensation where the stimulus is moderate or weak. Where the stimulus is very strong, probably pain-sensations are aroused. The theory in the case of a moderate or weak stimulus is that of a central *Mitempfindung*. Here the most serious objection is that the pleasantness or unpleasantness cannot, by any effort of attention, be isolated. But it is to be observed, says Stumpf, that in the case of isolated sensations of medium intensity, the pleasantness or unpleasantness is usually not pronounced. When several tones or colors are combined, the sensible affects are greater, and they are still greater in the case of tastes and smells. But here the non-isolability is not so certain. W. Nagel, for example, asserts that while it is impossible for him to reproduce smells, he can easily reproduce the feeling of their pleasantness or unpleasantness. A closer examination of this case, however, leads Stumpf to the conclusion that it is one of mood rather than of a simple sensory affection. But he believes himself to experience pleasant or unpleasant sensations and not merely, as he formerly thought, to perform acts of approval or disapproval, in read-

ing music while hearing other music, and he rejects the theory that, in this case, the mere notes are the bearers or sensational basis of the feelings rather than their psychical excitants. He admits, however, that the question of fact is at present extremely difficult to determine.

In presenting the hypothesis that the so-called sense-feelings and feeling-tones of sensations are not subjective states, but objects and materials of consciousness in the sense in which the acknowledged sensations are objects and materials of consciousness, Stumpf has no intention of obliterating the general distinction between the other sensations as intellectual and these as emotional; but this distinction, he holds, is not a descriptive difference affecting the qualities themselves, but a difference regarding their effects and psychical connections. And the distinction is not absolute, for muscle and temperature sensations also play a large part in emotion. The real importance of the suggested classification is in its application to psychological investigation. Among other questions Stumpf mentions that of 'untuned' sensations. On the 'attribute' theory, the feeling must be assumed by a sort of *a priori* necessity; but if the feeling is a *Mitempfindung*, we are under no such compulsion. There is a similar absence of compulsion in regard to the dependence of the feeling-tone on the sense-quality. There is a general constancy, but not such as to allow us to regard the feeling as simply a function of the sensation. The sensational view is especially hopeful, Stumpf thinks, for the still unripe problems of the individual and general evolution of the sense-feelings and the connected striking differences with like stimuli. The teleological theory, helped out by the principle of accommodation, is supported by some facts. But apart from the indefiniteness of the utility formula, how are we to apply it to the feelings connected with the higher senses? How can we say that the smell of the rose is useful, while that of garlic is harmful? Helmholtz's theory may account for the disagreeableness of dissonance, but what explains the agreeableness of harmony? Stumpf gives no answers to these questions, but he interestingly suggests a genetic theory for certain feelings on his hypothesis by reference to principles that obtain in the association of sensations, *e. g.*, directions of attention, dispositions of judgment, habits of various kinds.

The article is a noteworthy contribution to a tendency represented by a number of recent writers, Meynert, Lagerborg, M. F. Washburn, etc., a tendency with which the present writer is in sympathy—to break down the hard and fast distinction between sensation and feeling,—and deserves the careful consideration of all who are interested in the psychology of feeling and the related theory of value.

H. N. GARDINER.

SMITH COLLEGE.

A Study of Affective Qualities. S. P. HAYES. Amer. Jr. of Psychol., 1906, XVII., 358-393.

In 1902 Titchener published (Wundt Festschrift) the account of an investigation in which the tridimensional theory of feeling was put to an experimental test. The evidence was in favor of the dual theory, but the experiments were admittedly too few in number and dealt with only two of the Wundtian dimensions. In the present paper the work is continued and made to cover the three dimensions. Clangs and metronome beats are again the stimuli used, since Wundt himself admits that clangs are exciting and depressing, and that time intervals are straining and relaxing, whatever else they may be.

The technical details were carefully attended to. In the harmonical experiments a noiseless seconds pendulum was used. The 24 tones in three separate octaves were combined in all possible pairs, making a series of 276 pairs of tones. The series was formed by chance, and rearranged so that the same tone should never occur in two successive pairs. This series was given 12 times to each observer, 6 times with lower tone first and 6 with upper first. In each series the observers reported on one affective quality only.

In the metronome experiments two metronomes were placed in sound-proof boxes. A rubber tube with stopcock from each box joined at a Y, whence the sound from either passed through a single tube into the dark room, where it was distributed by a megaphone funnel. Fourteen rates were used combined in pairs, making a series of 91 tests. In each pair the slower rate was given first.

The conclusions from both experiments are as follows :

1. Judgments of pleasant and unpleasant were always easily made and natural. The curves of pleasant and unpleasant follow opposite courses.
2. No evidence was obtained of the existence of a plurality of pleasant or unpleasant qualities. Pleasant and unpleasant appeared to be homogeneous and simple.
3. Judgments of strain were easy and direct. Strain was described in muscular terms. Increasing strain meant uniformly increasing unpleasantness. There is therefore no evidence here of a new affective quality.
4. Excitement-judgments upon clang were varied. There is no specific evidence of an excitement dimension or of a number of different excitement qualities. The excitement judgments on the metronome tend to be purely intellectual. Fast rates are exciting, slow ones depressing; high degrees of excitement are found unpleasant.

5. Depression judgments are still less direct and observers report different experiences. For two observers depression meant tranquility, soothing calm, and the curves are pleasure curves.

6. Relaxation judgments vary. There is no evidence of a specific relaxation quality or dimension.

This evidence supports the dual over against the tridimensional theory. The author, however, does not give his results as conclusive. He claims only that whereas the tridimensional theory is dogmatic, his results are based upon experiments and observations 'made under standard conditions, with trustworthy observers, and by an approved method, which allows of the correlation of objective and subjective results.'

CAROLA WOERISHOFFER.

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Jealousy. ARNOLD L. GESELL. Amer. J. of Psychol., 1906, XVII., 437-496.

This is another of the series of papers which have been issuing from Clark University for a number of years. A questionnaire was sent out to various schools and individuals and returns have been received upon the basis of which to a considerable extent the work of the paper rests. A summary of the results is brought together at the close. Here we are told that jealousy is a fundamental instinct that bears strong resemblance to anger, fear and grief and shows relationship to the proprietary instinct. It is a safeguard against the social instinct, and mutual aid forms a strong off-set to jealousy. It appears in the lowest forms of animals and is equally fundamental in human beings, manifesting itself in the child of a few weeks. As the child grows the tendency to rivalry increases, and this instinct shows more complexity and refinement. The more expressive movements are less pronounced, and at adolescence depressive symptoms often appear. People of all temperaments are subject to it, but its manifestations are varied. It is "the most painful of all emotions, . . . due to the intense subjectivity of the psychosis, to the obstruction of impulses of pride and appropriation, to the disorganization of profoundly egocentric and highly systematized ideas." Some authors say it is the most universal form of hatred and therefore a study of its various forms is of the greatest value to society. Jealousy may become a factor in education as a stimulus to instruction, but it should be excited only in pressing necessity. History shows it to have been an important factor, too, in shaping social progress. The scope of jealousy is much wider than is ordinarily recognized and is the basis of many attitudes which individuals assume towards other individuals or toward society. It

modifies social customs and institutes a spirit by which whole groups or nations may be moved.

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The Effect of Music on Thoracic Breathing. EUGENIA FOSTER and E. A. McC. GAMBLE. Amer. J. of Psy., XVII., 406-414.

A series of experiments was performed at Wellesley College in the years 1903-4 and 1904-5 with the purpose of finding the relation between the emotional effects of different kinds of music and changes in respiration. The Sumner pneumograph was used, and results recorded on a kymograph. The subjects were college students.

The problem was two-fold: (1) the effect of music in major and minor keys; (2) the effect of loud and soft music. The music was furnished by the chapel organ, and the selections included hymn-tunes; some of Mendelssohn's chorals; compositions chosen for variety of major and minor passages; and certain ones chosen for variety of æsthetic effect.

The authors look upon the series of experiments as a mere beginning, for their results are vague. They only show that (1) listening to any sort of music tends to shorten the expiratory pause and to make the breathing faster and shallower—effects characteristic also of non-emotional mental application. (2) Music-stimuli do not seem to affect the regularity of the breathing. (3) There is no noticeable difference in the effect of major or minor, of loud or soft music.

In explanation of the fact that the records show the rapidity and shallowness, but not the regularity characteristic of attention, the authors suggest that music attracts the attention without steadily holding it or preventing associated trains of thought.

F. GERTRUDE SMART.

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ÆSTHETICS OF FORMS.

Ueber die Wohlgefalligkeit einfacher räumlicher Formen. Eine psychologisch-ästhetische Untersuchung. JACOB SEGAL. Arch. f. d. ges. Psychol., 1906, VII., 53-124.

The experiments on the æsthetics of simple visual forms on which this study is based were carried on at the University of Zurich during three semesters of 1904-1905 under the direction and with the participation of Professor Ernst Meumann. Only about a fifth of the article is devoted to the experimental procedure. The first part gives a critical account of the analogous investigations of Fechner and Witmer;

the last part analyzes the general æsthetic experience in the light of Segal's experimental results.

While Fechner's pioneer services in the field of psychological and experimental æsthetics can hardly be overestimated, it was inevitable that his work should be shot through with the metaphysical and logical views of his time. Such pre-psychological influences are seen in his retention of the logical principle of unity in variety, his belief in æsthetics as a normative discipline comparable to logic and ethics, and his assumption that pleasure in simple forms is psychologically simple and therefore unanalyzable.

Fechner's main purpose in his experiments was to discover a figure that was æsthetically pleasing without the aid of any associative factors. The subjects could not, however, exclude the subtler simultaneous associations, the general apperceptive determination of their judgments. Furthermore, his direction to choose the most elegant and harmonious figure insensibly influenced them to select the Golden Section rectangle. Had they been told to choose, say, the most stimulating figure, the results would have been quite otherwise. A more serious flaw is that without analysis of the æsthetic consciousness of his subjects his results were purely statistical, not psychological. His final æsthetic criterion is either metaphysical or a mere counting of votes.

Witmer's investigation was undertaken to test Fechner's results, and confirmed them. He accepted Fechner's theory of direct factors, but employed a much more accurate and refined technique, and took every precaution to rule out associations. With methods far less crude, his results are even more unsatisfactory than are Fechner's. He is still more statistical and quantitative. He makes large use of averages, thus covering up individual differences; and he recognizes no kind of associations except the clear successive associations of the English associationist school.

Segal's aim in his own investigation is purely psychological, to discover in the case of the observation of simple visual forms what goes on in consciousness when something pleases. From this point of view what displeases is of almost equal importance. He uses the serial method, as did Witmer, for ease of comparison. His experimental material was composed of series of lines, rectangles, zigzags, and triangles on white cards of equal size, laid on a black cardboard background. Each series was repeatedly placed before the same observer, for one of the main objects of the investigation was to discover whether the æsthetic reaction to one figure remained constant, and, if not, to inquire into the cause of the fluctuation. In most cases the intervals

between observations did not exceed three or four days; in two cases, however, there was an interval of eight months. Eight persons served as subjects, who had all had considerable psychological training. In the conduct of the experiments the existence of direct factors was treated as a problem, not as an assumption. The subjects were not instructed to select any special type of figure, but were asked to indicate the figures that were to them most pleasing, fairly pleasing, unpleasing, and indifferent. In the results the most pleasing and the fairly pleasing were grouped together. The subjects were also asked to abstract as fully as possible from thought of the utility of the object and from associations in the English-school sense. After each choice the subject was requested to give a full introspective account of the experience. The genuineness of the æsthetic preferences was shown by the fact that although at first the figures seemed in many cases of nearly equal value, later they aroused lively and opposed æsthetic feelings. Memory played a negligible part in successive judgments. In general the pleasing figures held attention better than the unpleasing.

The results show great variability in the judgments of the same figure; thus the figures receiving the largest number of positive votes, *i. e.*, judged pleasantest, also received the largest number of negative votes, *i. e.*, were judged unpleasantest. These 'reversals of judgment' with respect to a given figure occurred for all the subjects.

Even without the introspective reports the tables show that an æsthetic reaction to even the simplest object is a complex and not a simple conscious experience, that it varies from person to person and from time to time, and is modified by both the total personality of the subject and the immediately preceding consciousness. It is necessary therefore to study the æsthetic experience not only in its completed form but in its growth, to treat it not in isolation but in relation to the non-æsthetic attitude antecedent to it.

The introspections of the subjects confirm this view. At first meager and conventional, their accounts became full, independent, and couched in genuinely æsthetic terms. The figures were described as 'soft,' 'quiet,' 'restless,' 'energetic,' 'too tall,' 'too plump,' 'affecting breathing,' etc. On the last day as a control experiment the subjects were asked to judge specifically according to the formal geometrical relations in the figures. This they declared made their judgment forced, artificial, distinctly intellectual and non-æsthetic.

Four constituents of this total complex experience may be discriminated: (1) pre-æsthetic perception, apprehension of the meaning of the object; (2) 'Einfühlung,' the expressional and predominantly

aesthetic aspect; (3) organic feelings; and (4) formal feelings. Lipps is in error in denying the presence of associative factors in mechanical *Einfühlung* or the aesthetic reaction to simple geometrical forms. Associative elements are present in simple as well as in more elaborate aesthetic experiences. It is not necessary to derive the aesthetic from any single source, be it 'conscious self-illusion' or play. It depends upon relations between the perceptual and the reproduced factors, and these may be various. However, in general it seems to depend upon the number and the indefiniteness of the associative or reproduced factors. Segal's subjects testified that vague associations made the experience aesthetic, but that when fully identified they dissipated it.

Contrary to the opinion of Lipps, organic feelings undoubtedly contribute to the aesthetic experience, so long as they do not direct attention to themselves. (Such attention to any of the constituents of a complex experience disrupts that experience as a whole.) The replies of the subjects point overwhelmingly to the presence of organic feelings, due to changes in breathing, muscular tension, etc., in both perceptual and reproductive processes.

Besides these feelings, another type may be recognized, the process or formal feelings, due to ease or difficulty of perception, clearness or obscurity, reasonableness or unreasonableness, and the like. They are intellectual or critical feelings, entering into other types of experience, such as the scientific or the practical. As such they tend to break up the absorbed consciousness of the aesthetic experience.

This suggests that pleasantness and unpleasantness do not depend on corresponding causes, as is usually held, but on opposed. Consequently conclusions reached through an analysis of unpleasantness cannot legitimately be carried over to an explanation of pleasantness. Pleasantness is based on *Einfühlung*; unpleasantness on the formal, non-aesthetic feelings. Modern aesthetics needs to investigate this incongruity between pleasantness and unpleasantness.

To the reviewer the most valuable part of this article is the clear-cut criticism of previous experimental work in aesthetics. The positive positions taken are sound for the most part and in line with current thinking but not especially original or specific. The mystery of '*Einfühlung*' is not yet cleared up, and the treatment of the feeling element seems dubious.

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PERIODICALS.

Psyke, Tidskrift för psykologisk forskning. Edited by SYDNEY ALRUTZ (Upsala), with the coöperation of HARALD HÖFFDING (Copenhagen), ARVID GROTFELT (Helsingfors) and MOURLY VOLD (Christiania). Subscription price, 5 kr. Stockholm, Albert Bonnier.

This 'journal for psychological investigation' is the first of its kind to appear in the Scandinavian languages. It is announced that it will cover, in addition to general psychology, 'the special fields of religious, criminal, language, art, child, animal, pathological, and abnormal psychology.' From the appearance of the first number, it would seem that the demarcation of this wide scope does not mean that the journal is to popularize, but rather that it would encourage investigations by Scandinavians within such wide fields and give the contributor the greatest freedom in choice of psychological topics.

The articles of the present number are of a high standard, and the editorial staff is sufficient assurance that the journal will have a truly scientific character and a wholesome influence. One must admire the national feeling which leads to the publication of technical work in the languages of these countries, at the same time that one regrets that the language is an unfortunate barrier to the usefulness of the journal in other countries.

Two numbers appeared in 1906. There will be five numbers in each volume. Contents of Number 1: Harald Höffding, 'The concept will,' 5-22. G. Landtman, 'Mental qualifications for the priesthood among savages,' 23-27. Sydney Alrutz, 'Semi-spontaneous manifestations in hypnosis,' 28-60. John Landquist, 'Thinking with emotion,' 61-85. E. Nicolin, 'A case of somnambulism in a dog,' 86.

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PLAY.

Psychology and Philosophy of Play. (II.) W. H. WINCH. *Mind*, 1906, XV., 179-190.

In the second part of his essay,¹ Mr. Winch deals with the philosophy of play, discussing briefly the surplus energy theory, the preparation theory and the recapitulation theory, after which he gives his summary and conclusion.

In support of the surplus energy theory he quotes H. R. Marshall as saying that 'plays are occasioned by the diversion into certain relatively definite channels of surplus . . . energies,' the result of hyper-

¹ Cf. *PSYCHOL. BULLETIN*, III., p. 242.

nutrition, which have had no opportunity for active expression. From R. Wallaschek he quotes: "It is the surplus vigor in more highly developed organisms exceeding what is required for immediate needs, in which play . . . takes its rise manifesting itself by way of imitation or repetition of all those efforts . . . which are essential to the maintenance of life."

This conception appears clear. But is the manifestation of this surplus vigor a repetition of the efforts essential to life?

Mr. Winch does not consider Spencer's idea, that the 'pleasurable consciousness' is the work habit, to be representative of typical play, but rather work for work's sake. He holds that energy can but to a limited extent be drawn from work to play, and concludes that the surplus energy theory does not cover the facts.

The preparation theory, says Mr. Winch, attempts to account for the forms which play assumes, as the surplus energy theory shows the conditions of the possibility of play.

Quoting Marshall and P. Souriau, who hold that we have natural tendencies for the guidance of energies into practice which will be valuable to us in later life, Mr. Winch asks if the essence of play rests in the fact that it is preparatory to serious work. We know that human beings need such preparation for life work that play-time must be limited. Mr. Winch questions whether our knowledge is exact enough to enable us to decide if the playful activity of the young is an aid or a hindrance to later needs. He concedes, however, that the spontaneous activities of the lower animals seem to be preparatory, while those of man do not to the same extent. His explanation is that 'we consider the play of animals destined to the same life their ancestors led, while the changing environment of man demands new operations and readjustments.' Beliefs have the same general results as actions, primitive beliefs and their decay finding an analogy in the rudimentary organs of man, decaying, yet sometimes functioning strongly, and requiring sustenance.

Children's song-games remind us of the childhood of the race, when man worked by the coöperation of all his faculties.

Mr. Winch points out the inconsistency of Professor Groos's statement, that play serves to tone down present instincts rather than to strengthen them or create new ones, with his theory of play as a 'divinely appointed preparation for the work of life.' That young animals exercise organs in embryo before serious use gives them a 'survival value,' and that play is *Vorübung* (preliminary practice) or *Einübung* (preparatory practice) of embryonic organs, is an intel-

ligible hypothesis; but the trouble is to maintain it and the idea that play is to ease the decay of the old, and not to strengthen developing instincts.

While Professor Groos counts love-plays performance and not play, Mr. Winch classifies flirtation of human beings from childhood up as play, seeming to him to be practice for serious activity. The distinction, however, between preparation and exercise is difficult. "Is a boy playing with a gun exercising his soldierly instinct, or is he only preparing to exercise it?" Marginal cases, however, are always to be looked for.

The preparation theory considers play as a divinely appointed means of preparation for the functions of adult life, and as the evolution of man and the higher animals depends upon a long-continued adolescence, this theory seems plausible. It is worth while to compare it with the underlying conceptions of precocity.

Many precocious persons seem to be preparing in early childhood for the function of adult life. Psychologically such activities might be called play; but they are not *Vorübung* or *Einübung*, but *Ausübung* (execution) and cannot be appropriated by the preparation theory.

Evolutionary progress, according to this theory, demands a long period of play time before beginning the work of life. In the case of genius, however, life work begins early. This cannot be charged to the abnormal character of genius, for men of ability, though they do not specialize early, show early devotion to work, and intentional preparation for life, differing from the spontaneity of play. It is not easy to fit these facts with the preparation theory.

Mr. Winch concludes that all these preparations of adolescence are not the preparation of play; and that they are valuable as affording a long time for comparative plasticity which favors deliberate education.

Considering the recapitulation theory, Mr. Winch insists that 'if we hold the doctrine of biological recapitulation at all, we must . . . connect the spontaneous activities of childhood with a preceding stage in adult work and thought.' But to hold recapitulation as an empirical law is one thing, and to declare its necessity another. Professor Marshall says that in biological study there is an effort to escape the necessity of recapitulation. And Professor Miall insists that 'adaptations tend to be inherited at corresponding phases in the ontogeny and the phylogeny.' The conclusion is that recapitulation in biology will not cover the whole ground.

In conclusion Mr. Winch proposes to show whether or not there is any spontaneous advance.

According to the pre-Darwinian biology, a perfect being according to the law of his species would be the result of each individual development, granting liberty and sustenance. Thus unimpeded development, spontaneity and liberty became ethical ideals.

A great revolution was brought about by Malthus, and by Darwin with his doctrine of the Origin of Species. The moving force was spontaneous variation, but it might occur in more than one direction. Environment decided which should survive, and unimpeded development gave place to fight for existence. Correlated with their conception was the surplus energy theory, and their educational sequence the 'exaltation of competitive examination, and payment by results.' The dogmatic assertion followed: 'Ontogeny repeats phylogeny.' From this we have a 'logical bifurcation'; 'the child must pass through all these stages at a certain rate,' or 'the child shall linger as short a time in primitive stages as possible.' This theory requires that the spontaneous activities of childhood shall be recapitulatory.

The thought of today rejects both absolute liberty and equality in strife. The meaning of the survival of the fittest is shown to be the survival of the survivors, survival being the test of fitness; and 'limitation to biological recapitulation, physiological short-cuts and instinctive plasticity rather than instinctive reflexiveness, are dominant notes of latter-day science.' Impulse and instinct are no longer counted divine leaders.

On the other hand, recent work appears to demonstrate a trend in variation, showing it to be not indifferent in direction; although we have lost that faith in 'the inheritance of acquired character' which was one of the strong points of 'mid-century optimism.'

Mr. Winch regards play valuable as a brake. Mental life calls for periods of physical recreation by making little demand on the high nervous centers. Guilds of play are founded upon the view not of the divinity of natural play, but that plays may be devised to satisfy the longing for beauty, and to be an outlet for the desire for motion, while precluding all expression of low tastes.

It is for us so to employ play that it shall be 'relief from work,' and not a descent into barbarism; a means of maintaining that physical vigor so difficult to hold in the strenuous life of today; a suggestion of mental development in which 'we may find the earliest lines of approach for adult work and thought.'

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CHILD PSYCHOLOGY.

Imaginative Elements in the Written Work of School Children.

S. S. CALVIN and I. F. MEYER. Ped. Sem., 1906, XIII., 84-93.

Three thousand children in the grades and in the high school were asked to choose a subject from such topics as the following and to write upon it: A Funny Story I have Heard; A Poor Family; How Flowers Were Colored; A Fairy Story; A Voyage in an Air Ship in the Year 2000.

The results according to the various kinds of imagery were graded and tabulated. Visual images lead, followed closely by auditory, motor and tactile, and remotely by pain, gustatory, organic and olfactory. The most marked change with age is the drop in all except visual imagination at puberty after a continued rise to that point, and followed by a partial recovery during the high school period. The authors explain this by the general upheaval that accompanies the onset of puberty. 'Visual imagery' is more intellectual and hence is less affected. In harmony with this is the increase in scientific imagination and the correspondence between increase in visual imagery and increased correctness of expression.

All change in sense imagery is in general the same as has been found in sensations. Of complex forms of imagination, the heroic (courage, devotion, etc.) is highest, though it declines with age, especially just at the onset of puberty (14.77 average age for boys). Dramatic imagination (striking situations) ranks next with a similar curve. Scientific imagination (relating to machines, inventions, etc.) increases with age. The mythopæic (relating to myths and fairies) decreases with age. Religious imagination is highest in the fifth grade, probably because older children are more reticent in expressing religious feelings. Melancholic imagination (feelings of sadness and depression) is more prominent at puberty, especially with girls. Logical power grows with age, corresponding to increase in visual imagery. The sense of humor reaches its climax in the seventh grade, as do also the pain images. The lack of marked increase in images of feeling at puberty, when emotions are supposed to be especially strong, can only be explained by the repressive influence of school environment. No details are given as to the method of tabulation, *e. g.*, it is not stated whether choice of subject was a large factor in determining imagery at different ages (which would naturally be the case if the topics were not tabulated separately).

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JUSTICE.

Some Contributions of Psychology to the Conception of Justice.

JAMES H. TUFTS. *Philos. Review*, 1906, XV., 361-379.

Definitions of justice proceed from the standpoints of both the individual and of society. Since psychology deals with individuals and society as representing individuals, it can aid in getting a conception of justice. Such a conception would take account of the character of individuals as to origin and structure and of society as an interdependence of individuals. The problem is to get impartiality and uniformity in place of caprice. Abstract equality is real inequality. Full justice includes personal equality. The present scheme of distribution of property depends upon custom and tradition. Society asks about the mode of acquisition and it has the welfare of individuals at heart and takes equality as basis for distribution of goods. Equal distribution must consider deserts, efforts and needs. A second view regards the economic process as a contract between free individuals, and society has no concern in the contract. Possession is a legal right for continued holding. This is unjust, as property is acquired under conditions which must be accepted. The complexity of the life of individuals makes distribution unjust. The Americans prefer a society in which there is chance and an opportunity for large stakes to a society in which what is got is what is put in. Full development during school life must be given every individual. It is objected that awakened desire causes misery, but such a view is contrary to democracy.

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ATTENTION.

The Given Situation in Attention. F. ARNOLD. *Jour. of Philos., Psychol. and Sci. Meth.*, 1906, III., 567-572.

Arnold's attempt is to state an old problem in terms more up to date than the traditional ones. Following Dewey, our objects of perception and imagination are called the 'given situation.' The concept or term 'point of juncture' or 'connection between the self and not-self' is introduced as basal, and images are said to have fewer 'points of juncture' than perceptions and to have them 'differently stimulated.' But they too 'have reality back of them.' A little further on, the 'given situation' and the 'points of juncture' are identified, but this is probably a slip, since it would make the earlier statements meaningless. These 'points of contact' may differ in kind, giving rise to the different kinds of objects of which we are aware (visual, auditory, etc.).

Later we are told that the given situation includes both the self and external reality, though whether this means the self and its object, *i. e.*, the juncture, or the self and the not-self, *i. e.*, the 'reality back of' the juncture, we are not informed.

However, having a certain 'given situation,' the self, by its power of activity, may add to it, or supplant it by a second: having a certain 'juncture' or connection with the not-self it may make certain other 'junctures.' This is called the 'development' of the given situation, and attention is defined as the 'entire subjective aspect of the given situation under development.'

Translated as far as possible into definite terms, the theory seems to be an old acquaintance in masquerade. The fundamental realities are an active self and a real external world. The action of the self on the world or *vice versa* gives rise to a third and derivative reality called the object of consciousness. By its inherent activity the self can modify the production of this phenomenal object, which process of modification is the change of attention.

In the conclusion of the paper the author adds that to treat the subject properly, we must consider attention in '(1) its sensory aspect, (2) its ideal aspect, (3) its motor aspect, (4) its physiological aspect and (5) its mental field.' Why the other features commonly treated by psychologists along with these are excluded, is not indicated.

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THOUGHT-READING.

Les procédés des liseurs de pensées: Cumberlandism sans contact.

L. LAURENT. *Journal de Psychologie*, 1905, II., 481-495.

In this paper Dr. Laurent presents the results of experiments upon the species of mind-reading known as Cumberlandism. The method with contact is first described. From test variations it was shown that the most efficient contact is obtained when the experimenter or 'guide' places his hand between the shoulders of the subject or 'agent.' The guide then attends earnestly to the task he has selected to have the agent perform, such as finding a pin placed in a certain part of the room. The concentration of thought with which the experimenter regards the object to be sought occasions involuntary movements of his hand which, unconsciously felt by the subject, impel him toward his goal. Assuming this to be to the right, the subject moves toward the right until, exceeding the limit indicated, he is checked by a movement in the reverse direction. Following thus a method of

dichotomy, the successive vacillations become less until the object is finally obtained.

The account thus far seems plausible enough, but where the discriminations involved in the finer muscular coördinations are called for, such as picking up the pin or flipping it aside, the explanation becomes inadequate. For the author is not to be assumed as implying that an indication of movement at the point of contact may thus be conveyed to muscles structurally and functionally remote from it, yet there is lacking in the text any definite statement to preclude this inference.

Of Dr. Laurent's experiments especial interest attaches to those performed under conditions in which contact has been eliminated. Here the guide, standing at a distance of several meters from the agent, directs his thought, as before, to the appointed task — preferably a simple one and easily understood, such as the choice of an object upon a table. In this way repeated tests were made with the result that the transmission of thought without contact, hitherto discountenanced in the scientific mind because of its association with the spectacular representations of the popular spiritualist, appears worthy of elevation to the rank of established fact.

As to its interpretation the account is briefly this: The idea of every act manifests itself unconsciously in an automatic sketch of the act; the more intense the idea, the more exact the sketch. If the desire to transmit an idea be intense, there is an unconscious tendency of the entire body toward movements appropriate to the idea intended, so that there surges to the lips, correlatively with the involuntary muscular impulse in cases of contact, the verbal image of the words in which the command would be formulated if consciously expressed — this verbal image being strongest in persons whose memory is of the verbal-motor type. That the subject should divine the suggestion of the guide, when to the bystanders, alert for any word escaping him, no sound is perceptible, is ascribed to the heightened power of audition characteristic of subconscious attention. The subject, having his attention completely engrossed in the command which he awaits, is placed through inhibition in an absolute silence, being deaf to all irrelevant sounds and indeed insensitive to every impression save the single command to which his expectant attention is riveted. To this supersensitive audition Dr. Laurent gives the name 'hyperacousie.' The attention of the subject is first obtained through an effort of the will, but this conscious effort sinks into abeyance and is gradually replaced by an increasing degree of automatism, as repetition confirms the habit of subconscious action. The more complete the subconscious

state of the agent, the more accurate is his fulfillment of the task. The author presents the view that motor response is far more active to subconscious than to conscious thought, and that, therefore, the mimic portrayal of subconscious thought is proportionately more accurate than that of an effort of thought consciously directed.

A point of interest in these experiments is the greater susceptibility of the nervous and hysterical, whether in the rôle of agent or guide, the explanation consisting apparently in the restricted field of consciousness characteristic of the type, whereby the suggestion so completely floods the consciousness as to give to it the force of an irresistible obsession.

While the author's good faith in the conduct of his researches is beyond question, he fails to give a satisfactory report of the measures adopted to control his experiments — they are tacitly implied, rather than explicitly shown. The paper is throughout more descriptive than critical, the number and variety of the phenomena recorded appearing disproportionate to the meager evidence adduced in support of them. Further, there is no mention of the work of Hansen and Lehmann, directed along similar lines and reported in *Philosophische Studien*, Vol. XI., 1895.

However, Dr. Laurent's investigations into the phenomenon of thought transference without contact have contributed to establish its title to legitimate inquiry and to give an impetus which should direct further studies along these channels.

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WORK AND FATIGUE.

Le travail, la fatigue et l'effort. Z. TREVES. Année Psychologique, 1906, XII., 34-69.

This article is a résumé of the recent ergographic investigations. The following topics are discussed: (1) The conditions of maximal work. (2) The way in which the curve of work is presented according as it is obtained by electrical or voluntary stimulation. (3) The curve of work as expression of corresponding neuro-muscular fatigue. (4) The elements that should be studied in the curve of voluntary work and the way in which these elements vary with the different conditions under which the work is performed. (5) The relations existing between useful effect, fatigue and effort, in the course of rhythmical work.

A bibliography is appended.

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DISCUSSION AND REPORTS.

EYE-MOVEMENTS AND VISUAL DIRECTION.

Mr. Coyle, in his brief paper in the last issue of the BULLETIN¹ has pointed out an error on the part of certain supporters of the eye-movement theory of visual direction. He makes it evident that an upward movement of the eye may bring into clear vision the upper part of an object, and a downward movement the lower part, even with an *upright* image, under certain special conditions. These conditions are, that the entire set of lenses which give the upright image be attached to the eye itself, or included within it, and move with all the ocular movements. And consequently the statement by the eye-movement theorists that the inverted image, instead of offering a difficulty, is the one necessary condition of appropriate eye-movements, is mistaken. Mr. Coyle has thus helped to weaken what we might call the *a priori* deduction of the inverted image by the supporters of this theory; although leaving of course untouched a similar 'deduction' by the retinal-projectionists.

Some may perhaps feel that the eye-movement theory thus cleared of an illogical encumbrance is much strengthened, and is no longer open to the objections which my own experiments on upright vision may have seemed to offer. Mr. Coyle himself does not say this in his references to my work, and I would not be understood as offering any objection to his own excellent discussion. But it may not be amiss to point out that the arrangement of lenses which he describes, and which he shows would provide all that is required for an eye-movement explanation of visual direction, is not at all the arrangement under which my own experiments were carried out. In my case the lenses were attached to the head, or when mirrors were used they were fastened to the shoulders, and of course not to the eye-balls themselves; and consequently the eyes moved in the same independence of the lenses or mirrors as when ordinary eye-glasses are worn. During these experiments, therefore, *the ocular movements were not at all what the eye-movement theory would require, but the very opposite.* When the observer looked through the inverting lenses at the face of some one standing at a distance in the room, and wished to look instead at his feet, the front of the eyes had to move not downward but upward. And if the eyes were to view in succession the parts of a table

¹ *Upright Vision and the Inverted Image.* PSYCHOLOGICAL BULLETIN, Vol. IV., p. 97.

from base to top, they had actually to move *downward*. Since, in spite of this, there was a growing harmony between the directions of the field of view and those of the observer's organic sensations, it seems to me that the eye-movement theory, even in its new and purified state, cannot escape unscathed.

And for those who are not concerned especially for the eye-muscles, but who are inclined to attribute the visual space-quality to motor sensations of some kind, it may be well to recall that in those wider sweeps to right and left, when head movements were required and the sensations from the neck and shoulders ought to have controlled the feeling of direction, they actually failed to do so. The field of view here sweeping in the same direction as the head movements, but still more swiftly, brought it about that when one was most at home in the unusual experience *the head seemed to be moving in the very opposite direction from that which the motor sensations themselves would suggest*. Taken in connection with the subsequent experiments with mirrors, and with the evidence drawn from ocular photography, it would still seem that the accounts of vision wherein its spatial features are attributed so predominantly to motor sensations are hardly able to stand the strain of fact.

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While I am not among those who 'attribute the visual space-quality' *solely* 'to motor sensations of some kind,' I must take issue with Professor Stratton on one point.

Mr. Coyle's argument was directed primarily against the faulty analysis of the direction of eye-movement in an eye supposedly fitted for non-inverted retinal images and against the deductions based thereon. In such an eye, according to Mr. Coyle's demonstration, to see an object above the level of the head the front of the eye must be turned upward just as in the ordinary eye.

In Professor Stratton's experiment, as he points out above, the lenses were attached to the head, not to the eye-ball, making a third case. In consequence, to see an object above the level of the head the front of the eye must now be turned *downward*. That in spite of this fundamental shattering of old associations the observer was able after a time to coördinate his visual space with the touch-muscular space, seems indeed to demonstrate the *empirical* nature of the space coördination. But it does not, so far as I see, furnish any argument against the role of *motor sensations* in the coördination. Whether *B* be above or below the line of regard, 'by contraction of the proper

eye muscles we move the eye so that we will perceive *B* more and more distinctly,' and this is 'independent of what may happen to be the absolute motion of the eye,' to quote Mr. Coyle's words. In any of the three cases, the contraction of the eye muscles proceeds regularly, as the fovea fixates point after point in the field, and the arguments for the eye-movement theory hold quite as well if the front of the eye move *down* to see *up* as they do for the normal eye. In the new case we would call a certain direction *down* (as Professor Stratton learned to do during his experiments) because it was the direction of our feet in the visual scheme, or because objects fell in that direction. The *progress of muscular contraction* and of muscular sensations during a given alteration of the foveal image would be similar in all the cases; only the *role of the superior and inferior muscles* would now be interchanged.

If, now, head movements be added, we have merely to coördinate the sensations from new pairs of muscles with the eye-movement sensations. Professor Stratton believes that 'the sensations from the neck and shoulders ought to have controlled the feeling of direction' in his experiment, on the motor theory. Is there not rather involved the building up of a new coördination between two quite independent sets of motor sensations? I can speak with some assurance on this point, from having experimented myself at some length on writing while looking at my hand in a mirror. I found that after some practice I was able to *feel* the movement in the direction in which it seemed visually to occur. The motor element was *unchanged in amount* but *reversed in direction*—that is, the visual effect connected normally with one set of muscles was now connected with an antagonistic set. Here, as in eye movement, the arguments for the motor theory of space perception are, it seems to me, quite unimpaired (*and also not strengthened*) by the experiment.

The purpose of Mr. Coyle's paper, however, was not to support the motor theory. It was rather to point out an error in reasoning which had resulted from neglect to draw figures and work out the actual eye movements in the case under consideration. The same argument had been repeated time and again without challenge so far as I am aware; and it remained for an undergraduate student to discover the underlying fallacy, by *weighing the fish*.

H. C. W.

I fully agree with Professor Warren that the facts presented by me are not evidence that our motor sensations have no part whatever in vision; I had no idea of offering them as such. They do, however,

make it clear, it seems to me, that visual *direction* is not of itself a feeling of the *direction* of the movements of the eye, — whether of its front, or of its muscles. If a pull of certain ocular muscles toward the back of the head, and a depression of the cornea toward the feet can come to suggest to us a position in space above the head, it can hardly be thought that our sense of this upward position is derived from the felt character of the eye-movements. The visual direction cannot be said to be carried over, by a kind of irradiation, from them. They are, the rather, dominated by other influences, which give a sense of direction the very opposite of what the muscular sensations themselves would suggest. This of course does not mean that motor impressions play no rôle whatever; but only that, so far as the *sense of direction* in vision is concerned (and it was with direction that the eye-movement theory of upright vision was busied) their rôle would now seem to be merely what actors sometimes call a 'thinking part.'

G. M. S.

NEW YORK SECTION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION.

A joint meeting of the Section of Anthropology and Psychology of the New York Academy of Sciences and the New York Section of the American Psychological Association met in New Haven at the Psychological Laboratory of Yale University on Monday, April 22. There was an afternoon session at 3:30 and an evening session at 8. The afternoon session was opened by R. S. Woodworth, who described a method by which differences in order, or the relative position of the members of a series, could be measured and expressed in terms of deviation from a standard order. He showed how such a method might be used in memory tests and in correlation of individual differences. This paper was followed by a report from F. N. Freeman of a study of reactions by graphic movements which was carried on as preliminary to a general study of writing reactions. F. Lyman Wells next presented a paper on the validity of individual judgment as measured by its departure from an average and a comparison of the explicitly recognized standard of judgment with the standard actually employed. The paper by W. C. Reudiger which closed the afternoon session was a report of an investigation by the questionnaire method concerning the various types of mental reconstruction accompanying development and their distribution and accompanying conditions. This mental reconstruction was distinguished from reconstruction in religious experience.

The evening session opened with a paper by E. L. Thorndike in which were reported experiments in memory, in which the foreign equivalents of the native language were memorized, instead of nonsense syllables. Transference of practice was found in some degree and a much longer persistence of memory than in the case of nonsense syllables. The next report was of an investigation of the weight illusion by H. N. Loomis. This illusion was studied by taking a graphic record of the movements made in lifting boxes of equal weight but unequal size. It was found that the larger box was attacked with much more vigor than the smaller one. Then followed a paper by J. McK. Cattell on the distinction between perceptions and images. The greater subjective vividness of perceptions he ascribed to the greater intensity of the motor response attending them than that which attends images. He supported his conclusions by the consideration that experiences which are normally subjective become objectified when accompanied by intense motor response as in the case of hallucinations. The last paper, by W. P. Montague, consisted chiefly in a criticism of the Humanistic account of truth as set forth by Schiller. As contrasted with the view that the criterion of truth is the value of its consequences, the 'common sense' view that truth consists in point to point correspondence of a proposition with fact was defended provisionally. A brief discussion followed each paper.

FRANK N. FREEMAN.

YALE UNIVERSITY.

BOOKS RECEIVED FROM APRIL 5 TO MAY 5.

The Numerical Proportions of the Sexes at Birth. J. B. NICHOLS.

(Memoirs of the American Anthropological Association.) Lancaster, Pa., New Era Co., 1907. Pp. 247-300.

The Kingdom of Man. E. RAY LANKESTER. New York, Holt, 1907. Pp. xii + 191. [Collected papers, among them the author's recent presidential address before the British Association, on the 'Advance of Science.')

Dictionnaire de philosophie ancienne, moderne et contemporaine. Abbé E. BLANC. Paris, Lethielleux, 1906. Pp. xvi + 1247. [An important work by a Catholic authority.]

Handbook of American Indians north of Mexico. Ed. by F. W. HODGE. Part I. (Bull. No. 30, Bureau of Amer. Ethnology, Smithsonian Institution.) Washington, Gov. Printing Office, 1907. Pp. xix + 972. [Illustrated and arranged alphabetically, constituting a dictionary of Americanism.]

Reason, Thought and Language, or the Many and the One. D. MACLEANE. London and New York, Froude, 1906. Pp. xvi + 583.

NOTES AND NEWS.

PROFESSOR JAMES H. LEUBA, of Bryn Mawr College, is going abroad in June on leave of absence for a year. Mr. C. E. Ferree, now assistant in psychology at Cornell, has been appointed lecturer in psychology at Bryn Mawr, and Miss Grace Fernald, who takes her degree this year at Chicago University, is to be laboratory demonstrator. Mr. Ferree is to remain at Bryn Mawr on Professor Leuba's return.

PROFESSOR A. T. ORMOND, of Princeton University, has recently visited a number of institutions in the South and delivered lectures on various philosophical topics.

IT IS PROPOSED to reprint Dr. Seguin's work on *Idiocy and its Treatment by the Physiological Method*, provided sufficient subscriptions are secured. The project should appeal to those interested in abnormal psychology as well as physicians. (Subsc. \$1.75; Publication Board of Teachers College, Columbia University, N. Y.)

From May to September 15, MS. communications, etc., for the PSYCHOLOGICAL BULLETIN (as well as for the REVIEW) should be addressed to

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Baltimore, Md.

